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[For information on the topography, climate, agriculture and commercial crops, irrigation, stock raising, natural resources, production and supply, waterways, railways and roads of the valleys of the Tigris and Euphrates between the plateau of Asia Minor and the Persian Gulf discussed as one geographical unit rather than by political boundary, see M1 Middle East, Cat. 116, 21: Fisher, pp. 340-370.]

[For information on the topography, occupations and relative productivity of the desert plateau, and of the Arabian Peninsula as a whole, see M1 Middle East, cat. 116, 21: Fisher, pp. 427-449.]

1: Longrigg G-4, 5 (ca. 1915-1940) MH1 Iraq MH1

farmed it with improved techniques; and an 'Iraqi-Syrian group, that of the 'Asfar concession', signed with Government in 1924 an ambitious land-development and irrigation agreement, involving the construction of the Ḥabbaniya reservoir, a Faluja barrage, and a dam on the Diyalā. Limited cotton-planting without notable success was carried out in 1925 by an Asfar affiliate, Diyala Cotton Plantations; but the terms of the main concession were soon afterwards called in question by popular outcry, its semi-monopolist nature was revealed, and the whole enterprise was perforce reconsidered.

Meanwhile, a Government anti-locust organization, on the scale which this ruinous pest demanded and using every known method, came into being in northern 'Iraq while Government participated in interstatal plans jointly established in Damascus. The deplorable harvest of 1924, the result of excessive cold and rainlessness, was a reminder of the precariousness of agriculture. The small Veterinary Department under Chadwick, besides its work with Army and Police horses and its civil animal hospitals, did what it could to control the endemic and epidemic diseases of the 'Iraqi flocks and herds, especially rinderpest which caused great annual losses.

Roads, mechanical installations, and buildings were the responsibility of the Public Works Department, of which the Directorship was passed by J. M. Wilson, in that office since 1920, to A. S. Clay in 1925. Roads were still at this period unsurfaced and deep in mud or dust, but constant care kept them somehow open. The mileage of road and track available for wheeled transport increased threefold, and hundreds of passenger and freight-carrying cars plied on every route. The care of these, with their accompanying repair shops, supplies, and dealers formed a new branch as much of industry as of travel. A trans-desert motor route, passing by Ramadi and Ruṭba to Damascus and the Levant, was inaugurated in 1923 by two New Zealanders, the Nairn brothers, whose headquarters was at Damascus. It had immediate effect on 'Iraq's foreign orientation. The service in 1926 absorbed its first (Syrian) competitor, which, using a track by Hit and Palmyra, had been the victim in 1925 of a savage attack by Dulaym tribesmen. The Ruṭba–Damascus section of the Nairn route became unusable in the summer of 1925 by reason of the Druse rebellion, and for a year thereafter convoys were diverted to 'Amman and Haifa through the forbidding lava country of Transjordan. The carriage of mails by the desert motor route became usual, until air-mail services superseded it. Postal arrangements within 'Iraq, now under 'Iraqi administration with British expert advice, grew more comprehensive and included all normal post office services. Telegraphs were

7: International Bank N, S-4 (1951) 1952 MH1 Iraq MH1

sumption; and other fruits and nuts are cultivated, mainly in the North.

Livestock raising is an adjunct to agriculture rather than an integral part of it. Sheep and goats predominate because they thrive despite poor grazing and feeding. Sheep and goats, as well as camels, are kept primarily by pastoral nomads who probably number well over 200,000. Cattle and water buffaloes are the livestock of the settled agricultural population. Many peasants, however, have no livestock at all except for a draft animal or two. Livestock are left to forage for themselves, with only some supplementary feeding with straw and perhaps barley in the winter. Only livestock in and around the cities are systematically fed.

Crop yields are generally low. The water supply is frequently inadaquate. Agricultural methods have on the whole remained unchanged for centuries. Little or no animal manure or fertilizer is applied to the soil, animal dung being used largely for fuel. Crop rotation is wholly inadequate and makes little or no provision for soil-building crops. Salinity, attributable to poor drainage, has materially lowered the productivity of land in the irrigation zone. Owing to insufficient and poor draft animals and lack of proper equipment, the soil is often poorly prepared, and weeds detract from the yields. Up to half of the winter crop area is left fallow as a means of restoring fertility, but since the land is generally allowed to go up in weeds to afford grazing for animals, the efficacy of the fallow system is limited. The productivity of livestock is also low, primarily because of inadequate feeding, but also because of poor breeding, disease and insufficient shelter.

Except for some rather limited areas in various parts of Iraq and a promising settlement in the Dujaila district of south-central Iraq, the country is almost wholly devoid of peasant proprietors. The ownership of cultivated lands is largely in the hands of sheikhs and urban proprietors who entrust the actual cultivation in small parcels to sharecroppers. These sharecroppers have neither the equipment nor the knowledge to increase production and for the most part eke out a bare subsistence.[2] The land assigned to the

[2] According to the cadastral survey which is half completed, 67.1 percent of the privately-owned land is in units exceeding 1,000 donums. (One donum equals 0.25 hectares or 0.617761 acres.)

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241 [387] yields. As will be indicated later, inorganic fertilizers could probably be produced cheaply in Iraq and organic fertilizers could be produced as by-products of the slaughtering industry.

231 4. Livestock Improvement

The productivity of livestock is extremely low, primarily because of inadequate feed supply. In addition to the production of fodder crops, measures should be taken to improve natural pasture lands, particularly in the northern mountains, which have generally suffered from over-grazing. Reseeding and rotational grazing are necessary. Productivity could be further raised by the establishment of shelters, better breeding methods, especially the introduction of new and improved sires and maintenance of stud stations, and by more effective control of parasitic diseases through an increase in the number of veterinarians and the provision of more extensive diagnostic facilities in the provinces.

The quality of livestock products could be raised considerably by a number of measures. One of these is an improvement in the practices and more stringent sanitary supervision of abattoirs. Others would be the establishment of a number of wool shearing and grading units under the guidance of an appropriate expert; appointment of a hides and skins expert to serve as general manager of the newly established Hides and Skins Association; and recruitment of an abattoir specialist to train local abattoir supervisors in improved methods of flaying and preserving hides and skins.

234 At present, even the major cities are without a clean, safe milk supply. The supply of milk could be substantially improved by better feeding of livestock, concentration of milking cattle in well-equipped settlements on the outskirts of cities, and central collection, transportation and processing of milk under strict sanitary controls. The possibility of cooperative collection and processing of milk should be explored.

231 [233] Since the nomads and semi-nomads, who may number from 200,000 to 500,000, account for a large proportion of the livestock in the country, particularly sheep and goats, their needs must receive special attention. Measures should be taken, for instance, to provide them with better watering facilities, sheep-dipping stations,

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and trained medical and veterinary assistants to control disease. In the North, livestock shelters would reduce the high mortality in the winter. In the long run, however, livestock raising is likely to become increasingly the preoccupation of settled farmers, particularly as the area under cultivation is gradually extended and natural pastures correspondingly restricted. Mixed farming, in which livestock raising based on the production of fodder crops would have its appropriate place, would greatly enhance incomes, especially because it would give more year-around employment to farmers who now, with the concentration on winter crop production, are underemployed for the greater part of the year.

5. Research and Education: Incentives

While is it relatively easy to point out what should be done to improve agriculture and livestock, devising the means to accomplish the improvement is incomparably more difficult. The means available to the state for a direct attack on low productivity are necessarily limited. The government can, of course, lay out drainage schemes, make more water available, provide facilities for combatting plant and animal diseases and pests, establish livestock shelters, assist in organizing cooperatives, and furnish more ample credit facilities. However, except perhaps in the new settlement areas, the state cannot prescribe better crop rotation, the use of improved seeds, better methods of cultivation and the like. These depend on private initiative which can at best only be stimulated and encouraged by the government. In some circumstances farmers can be relied upon to seize the initiative, as in the case of cotton where high prices have stimulated a rapid expansion of production. In the main, however, greater productivity depends on the success of efforts to persuade large numbers of landowners and cultivators to change their time-hallowed methods and techniques. For this reason principal reliance will have to be placed on education, supported by practical research and supplemented where feasible by financial incentives provided by the government.

First of all, steps should be initiated immediately to organize an effective extension or advisory service to farmers. At present the Department of Agriculture has less than 25 qualified agriculturists capable of research and educational work, and much of their

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value of the country's total exports, other than oil, in the years 1948-1950. Citrus fruit, grown for domestic consumption, is of considerable importance in the Diyala River valley and substantial quantities of other fruits and nuts, although of rather poor quality and marketability, are grown in the North, especially in Sulei-maniya and Erbil. Vegetable culture is of particular importance in the neighborhood of large cities.

Agricultural yields are generally low, although most of the soil is inherently quite fertile. Barley yields, for instance, are about 30 to 35 percent less than those in Canada and the United States and probably slightly less than those of Turkey and Iran. Little or no animal manure or fertilizer is applied, animal dung being used largely for fuel. Salinity attributable to poor drainage has materially lowered productivity of land in the irrigation zone. The soil is often poorly prepared, and weeds detract from the yields. Chief reliance is placed on the fallow system to restore soil fertility, but, since fallow land is often allowed to go up in weeds on which animals graze, its efficacy is limited.

The raising of livestock is an important industry. Sheep and goats predominate because they thrive despite poor grazing and feeding.

TABLE 6

ESTIMATE OF LIVESTOCK POPULATION, 1949-50

Sheep	7,489,700
Goats	1,754,300
Cattle	1,034,600
Buffaloes	200,700
Camels	279,200
Horses	183,800
Mules	66,850
Donkeys	326,400

Sheep and goats, as well as camels, are kept primarily by pastoral nomads who probably number well over 200,000. Cattle and water buffaloes are the livestock of the settled agricultural

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231 population. Livestock, however, are an adjunct to agriculture rather than an integral part of it. Many fellahin have no livestock at all except for a draft animal or two. Livestock are left to forage for themselves, with only some supplementary feeding with straw and perhaps barley in the winter. Only the livestock in and around the cities are systematically fed. Livestock yields are generally very low, primarily because of inadequate feeding, but also because [439] of poor breeding and disease. Yet livestock and livestock products —wool, hides and skins, and casings—accounted for about 13 percent of the total value of Iraq's exports, exclusive of oil, in the period 1948-1950.

Industrial Output

433 Industrial production is still very small. Reliable figures on industrial output and employment are unavailable. According to the Department of Labor, there are roughly 2,400 enterprises in industry, exclusive of service industries, employing over four persons. From Department of Labor data as well as certain supplementary sources, it is possible to give a breakdown for approximately 45,000 people engaged in industrial production. As already indicated, the actual number of people so employed is apparently considerably greater if account is taken of small handicraft enterprises. About 11,500 are employed in petroleum production and refining. The textile, apparel and footwear industries probably employ about 11,000 people. The processing of food, beverages, tobacco, other agricultural products and livestock products accounts for an employment of perhaps 9,000; the production of building materials, including bricks, tile and cement, for about 6,000; and wood processing, for approximately 2,000. Metal-working and machinery repair and maintenance account for most of the balance.

These employment figures tend to convey a rather exaggerated impression of possible industrial output. With the exception of those in the petroleum industry, virtually all are employed in small undertakings where the work is predominantly done by hand and productivity is accordingly very low. It is estimated that only about 2,000 people are engaged in what might be characterized as modern plants. Among these are one woolen and one cotton mill, one brewery, several distilleries, a cement plant, a vegetable oil and soap factory, and a number of flour mills.

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ANNEX C

AGRICULTURE AND ANIMAL HUSBANDRY

I. Introduction

The main features of agriculture and animal husbandry in Iraq have already been set forth elsewhere and are only briefly recapitulated here.[1] Barley, wheat, rice, dates, other fruits and vegetables, and, more recently, cotton are the principal crops. Animal husbandry is of great importance but at present is really not integrated with agriculture. There is virtually no mixed farming. Crop and livestock yields are very low. Poor feeding is the principal cause of the low productivity of livestock. Low crop yields are attributable to poor drainage in the irrigation zone, to the failure to maintain soil fertility through the use of manure and fertilizer and the cultivation of soil-building crops, and to inadequate tools of production. Advances in agricultural techniques are seriously hampered by the poverty and ignorance of the fellahin who cultivate the soil and by the lack of interest displayed by most of the large landowners in improving agriculture. While there are extensive lands that can be put to the plow, particularly if more water is made available, a substantial portion of the land now in exploitation may be said to be overpopulated considering the present level of agricultural technique.

An increase in production is urgent. The standard of living which now prevails on the land is deplorably low. At the same time the population is increasing at a rate that can be expected to grow more rapid as public health improves. Output can be greatly increased both by extending the area under cultivation and by raising the productivity of land already being exploited. Primary emphasis has hitherto been placed on the first of these, and large new water storage and irrigation schemes are being planned.[2]

[1] See Annex A, *Basic Factors and Conditions.*
[2] See Annex B, *Flood Control, Irrigation and Drainage.*

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II. Diversification of Production

Fodder and Pasture

Existing crop rotation is far too limited and does not make effective use of the land. Wheat and barley are virtually the only winter crops. There are a considerable number of summer crops, but cotton and rice clearly predominate. Rice is really outside any crop rotation, since, for the most part, it is grown year after year on naturally inundated land. Fallow generally takes the place of good crop rotation. No doubt the large amount of water required for summer crops in relation to the available supply has hindered the introduction of new crops, but the water storage schemes that will be carried out over the next decade should bring a change in this respect. Moreover, economies in the use of water which may be effected may in the long run make more water available for summer cultivation.[3]

Basically the aim in the future must be to make fuller use of the land and the people who work it. The cultivator who grows wheat or barley in the winter does not have enough to occupy him except at sowing and harvest time and has still less to do in the summer. Conversely, the rice farmer has virtually nothing to do in the winter. On the average, cultivators keep little or no livestock outside of a draft animal or two and they grow no fodder and plant no pasture for their livestock. Hay-making is unknown. While in and around the towns grain, oil cake and cut legumes are used for feeding, in general the most important source of feed for sheep, goats, buffaloes and cattle alike are grain stubble and the uncultivated grasses and herbage. Thus the animals are left to forage for themselves. Under these conditions their food is adequate for only five to six months, barely sufficient for maintenance during three to four months and at starvation level for the remainder of the year.

Introduction of a mixed type of farming which will include leguminous fodder crops in the rotation with cash crops would mark a most important advance in Iraqi agriculture. Such crops will enrich the soil as well as provide feed for livestock. Better

[3] See Annex B, *Flood Control, Irrigation and Drainage*, pp. 208-09.

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241 feeding will make livestock far more productive and resistant to
231 disease and produce better and stronger draft animals. By making the keeping and systematic feeding of livestock an integral part of settled agriculture, the people on the land will be assured fuller employment and higher incomes. Livestock should play a more prominent part in the farm economy for still another reason. The great bulk of the sheep and goats, which constitute over 80 percent of the livestock, are the property of nomads and semi-nomads.
[221] Nomads from the northern and southern deserts regularly move into the riverine areas in search of summer pasture; and semi-nomadic shepherds move within the irrigated areas feeding their flocks on green barley, grain stubble and the grass and weeds of fallow land. Both are meeting with increased resistance from the settled farmers; and in any event the expansion of the area under irrigation will increasingly curtail the pasture available to the nomads. Thus the remaining nomadic tribes will need to be gradually settled, but they will adapt themselves readily to settled agriculture only if it will enable them also to maintain considerable livestock.

246 Among the forage crops berseem or Egyptian clover, a winter annual, is well-adapted to most of the irrigated area of Iraq and could be grown on a much larger scale. Sown in the grain stubble in late summer, it will provide a good pasture, soiling and hay crop. Alfalfa, a perennial, also makes a good forage crop capable of yielding 1.5 to 5 tons per donum for two to five years. However, in view of its deep roots, it cannot be recommended unless good cultivating equipment is available to kill it when necessary. For summer pasture, quick-growing crops such as millet or binder crops such as maize and sorghum should be grown. Summer legumes—cowpeas and mungo beans, and particularly the black mungo of India —can be recommended. The lack of water during the summer makes the problem of forage crops in the rain-fed zone more difficult. Large areas can, however, be planted to winter oats and vetch which, when cut, cured and cocked, will provide a good reserve feed.

248 The increased production of cotton which has taken place recently should be an excellent source of livestock feed once farmers learn to appreciate the value of oil cake feeding. For this

7: International Bank N, S-4 (1951) 1952 MH1 Iraq MH1

In any discussion of pests the damage caused by weeds is worth emphasizing again. Poor tillage and the tendency to use idle land as pasture has caused a rapid spread of Bermuda and Johnson grass in the irrigation zone. These pests have actually forced a considerable amount of crop land out of production and have lowered the yield of such summer crops as cotton, maize and sesame.

VI. Improvement in Livestock and Livestock Products

Improvement in both the quality and quantity of livestock production is likely to be of growing importance in the future, particularly since the anticipated rapid increase in public expenditures on development as a whole will create an expanding and more discriminating market for animal products.

In general the types of livestock found in Iraq represent rather hardy animals which, through a process of natural selection, have become fairly resistant to the rigors imposed by a severe climate and inadequate feed supplies. This does not mean that improvements in breeding cannot be effected. At present breeding is largely haphazard and uncontrolled, particularly as to timing and the selection of sires. It is a well-known scientific fact, however, that the evaluation of genetic factors influencing production in any direction—meat, milk, wool, work, and the like—cannot be properly assessed unless the nutritional level is first improved, thus permitting the full genetic development of the livestock to take place. Iraq is a particularly striking illustration of the truth of the old saying that "half the breed goes into the mouth."

One of the best methods of exploring the possibility of improved breeding and the results of better feeding and other livestock practices would be to establish a number of herds and flocks of indigenous breeds of livestock as well as poultry on government farms throughout Iraq. There careful records would be kept to discover for the first time what these animals can really produce with improved feeding, breeding and management. These livestock stations could also provide progeny-tested sires to farmers for

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So Maqdad took the bag of gold and he went to the market in Hilla where there were offered for sale horses of the finest stock and of the finest blood. And there he saw a horse of between two and three years, and its colour was as black as jet and its beauty surpassed the beauty of all horses, and the horse looked at Maqdad with a look of friendship and affection. So Maqdad turned to the merchant and said: What is his price? Now, the merchant looked at Maqdad and saw that he was dressed as a ragged shepherd boy and he laughed and said: O master of wealth, begone from here and do not trouble us further, for we are afraid that you will offer us so much gold that we cannot lift it from the ground, for we are poor and feeble. Please go from here and do not tantalise us further with your wealth.

Maqdad was angered at the scorn of the merchant and he said: My wealth is greater than your wealth, and I wager you a wager that my purse has more gold than your purse, and the stake shall be my purse against your purse. And the merchant thought: Verily God has deprived this boy of his reason, but let us amuse ourselves and draw a crowd, for it will be good for business. So the merchant called for witnesses, and a crowd collected, and the conditions of the wager were cried out.

Then the merchant drew from his pocket a mighty purse and he said to Maqdad: Let us see your money. And Maqdad's heart went cold when he saw the size of the merchant's purse, and he drew out his own purse and it was smaller than the merchant's. And the merchant spread his coins on a carpet and they saw that there were five hundred dinars of gold and a thousand dirhems of silver and two thousand fils of copper. And Maqdad spread out his coins on the carpet and they saw that he had

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a thousand dinars in gold, and he had not a single coin in silver or in copper. And the witnesses said: The shepherd boy wins the wager.

Maqdad took the purse of the merchant and put the coins of gold and silver with his own gold, but the copper coins he caused to be thrown to the poor. And he turned to the merchant and asked the price of the horse, and a price was agreed on and paid. Then Maqdad asked the merchant for the pedigree of the horse and for his name. The merchant was astonished, and asked: Do you ask the pedigree of the horse after the price has been agreed and paid? Maqdad replied: His pedigree is written in his legs and his back and his noble head, but it must also be recorded on paper, and that is what I require. And the merchant handed the pedigree to Maqdad, saying: Verily he is descended from the Prophet's noble mare, the feather coated, the most beautiful of all. His name is Rishan, for he is of that noble breed.

Maqdad took the horse Rishan and mounted him bareback and rode to his home. And his mother brought out the saddle of his father and it fitted the horse Rishan, and she brought out the weapons which she had cleaned till they gleamed in the sun. And she brought him a bag of dates and a bag of cheese and she said: Now shall you ride to the Tigris and to the camp of the tribes, and there shall you enter the guest tent and salute the assembly, and they will bid you to be seated and bring for you coffee. Then they will ask your name, for they do not know your face, then shall you reply: I am Maqdad son of Thamir son of Degaither son of Mansur son of Maqdad son of Degaither son of Mansur son of Qais son of Hamed the Lame son of Mansur the Father of the Sword. And this name is a known name, and wherever you say it, there shall you be

8:Campbell T-5 (no date) 1949 MH1 Iraq MH1

1. THE STORY OF HAJJI ALI, THE GREAT SULTAN AND HIS SON, THE AMIR KHEYYUN

The Maadan. Page 12, Line 17. 'The Maadan shall bring milk.'

The Maadan are in the main a tribe of poor families, living in scattered communities on the shores of that great area of marsh and lake which lies between the Tigris and the Euphrates before the two rivers finally join to form the Shatt el Arab. Maadan villages often acknowledge the authority of sheikhs of neighbouring tribes, and they have no great tradition of their own. Their chief source of wealth was in the past their large herds of water buffaloes, their income being derived from the sale of milk and its products, lebn (a kind of curd), and clarified cooking butter. The sale of milk is regarded as shameful by most tribes, though of course all produce enough for their own requirements. In consequence the Maadan, with their trade in milk and hides, are looked down on by the tribes, and they are said to be lacking in honour. However in the last twenty-five years the Maadan have acquired large areas of agricultural land, and they are sharing fully in the increasing wealth of South Iraq. As for their honour, I remember a fight three years ago which took place between two Maadan subsections not far from Qarmat Ali, just outside Basra. This was a fight for a woman's honour in the best tribal tradition in which nothing was lacking either in the number of rounds of ammunition expended or in the casualties to bring it fully up to the standard of the great tribes in these matters.

2. A STORY CONCERNING THE IGNORANCE OF SLAVES

Slaves.

'Abd, or slave, is a slang expression in South Iraq for a Negro, and does not now indicate an actual slave. Slavery continued in Iraq to the end of Ottoman rule, 83 years after its abolition in the British Empire. In this story, therefore, the word would refer to actual slaves, and I have so translated it. The word 'habshi' (lit. 'Abyssinian') is little used in South Iraq, a Negro being referred to as a 'sambo' or 'abd'.

Crocodile. Page 20, Line 3. 'In that river was a crocodile.'

The word used was 'timsah', or crocodile, of which of course there are none in Iraq. I do not know if this indicates that this story

3:Royal Institute of International Affairs U-4 (no date)1954 M1 Middle East
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time, which, prolonged by primitive methods, may interfere with or even prevent autumn tillage and sowings. Because of the low density of population, an improvement in the water-supply of a given area in the irrigated zone usually causes a shift of population from less favoured areas, which consequently go out of cultivation. This tendency is greatly increased by the unstable nature of the rural population, a great part of which have settled to cultivation within the last century and have no lengthy attachment to their locality. Political circles are alive to the need for reform, and recently an attempt has been made to establish small-holders on lands newly introduced to irrigation (for example, on the Abu Ghuraid and Dujaila canals), and to establish co-operative organization. In 1951 a law was passed for the distribution of state land in parcels of varying size to selected settlers, up to 20 per cent of each area to be allocated to graduates of agricultural schools and former members of the police and army, and up to 25 per cent to civil pensioners and unemployed school graduates. An Agricultural and Industrial Bank, formed by the Government in 1936, contributes to the welfare of small landowners by providing cheap credits, though its resources are inadequate for the need.

Livestock

Raising livestock is of major importance both in the internal economy of the country, by providing food, transport and traction, and raw material for essential manufactures, and also in foreign trade. In the period 1948–50 livestock and their products—wool, hides and skins, intestines (casings)—accounted for about 13 per cent of Iraq's total exports excluding oil.

Most of the rural and much of the urban population depends to some extent on animal husbandry for a living, but methods have hitherto been mostly primitive and unsystematic, being semi-nomadic and divorced from crop-raising, with little attempt on the part of the owners to supplement natural feeding except in winter, or to improve the breed or combat disease. Quality and productivity are consequently low. The Government Department of Animal Husbandry, however, is experimenting to improve the breed of cattle, sheep, and mules and the Government controls the importation of animals to safeguard the native stock from diseases from which it is at present free, such as rinderpest and contagious pleuro-pneumonia. By irrigation, water conservation, and control of pasturage a more permanently settled system could be evolved, integrated more closely with the production of crops.

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245 Iraq produces about 80 per cent. of the total
[439] world supply of dates—that is, of the proportion of dates that form an article of commerce, because most dates are eaten directly by the growers, or else bartered. The general conditions under which date palms thrive have already been touched upon, and it is sufficient to recall that the palms can flourish in dry, saline, sandy, loamy, or even water-logged soils, although the maximum yield of fruit is obtained when abundant water is available.

The region of the Shatt el Arab is pre-eminently suited to date-production, and both banks are lined with date groves extending inland for about a mile and a half. Some 25 to 30 million palms are cultivated throughout the region, and of these, one-half are found close to the Shatt el Arab, the rest occurring along the river banks as far north as Latitude 33° N. A curious feature is the rise of the river under the influence of the incoming tide. Fresh water is ponded back in the Shatt el Arab, and floods the banks to a depth of as much as 3 feet to provide natural and regular irrigation of the groves—a phenomenon that from the point of view of the native farmer is wholly estimable.

In order to ensure a good crop, the land is dug over once every four years; and because of the frequent presence of creeks and water-courses, this must be done by hand. Artificial pollination is, as we have already seen, highly necessary; and though most groves include 3 per cent. of male palms, the district of Fao has developed a special trade in male pollen dust, from which other date-growing regions are supplied.

About 130 varieties of date are known, but three are most widely grown. The *Halawi* palm produces the finest fruit, but gives only a moderate yield (44 lb. per tree) (Dowson), whilst the *Sayir* produces slightly less, but is more tolerant of inferior growing conditions, and is probably the most widely grown. The *Zahidi* does not give a fruit of high quality, but the yield is over 120 lb. per tree, and this compensates for the low price obtained. Fertilisation of the female palm takes place in April, and picking begins in August, when large numbers of nomadic tribesmen move into the date-growing areas to work as seasonal harvesters.

273 Besides forming an extremely important part of local diet, dates
231 are used in the distilling of *arak*—the chief fermented beverage
313 outside the vine-growing areas, and one thought to have value as a
289 prophylactic against malaria. The crushed stones are fed to cattle, and both leaves and trunk of the palm are used in light constructional work (houses, boats, even bridges), and also in the manufacture of paper.

tables in season. Citrus fruits flourish in the irrigated areas of Kerbela province and in the Diyala river valley, while grapes, apricots and other fruits grow in various localities. Numerous species of dates are cultivated, especially in the Shatt al Arab and lower Euphrates basins: they represent one of the basic foods of the people.

The financial circumstances of most families prohibit the consumption of meat, except at irregular intervals. Sheep and goats are raised in large numbers, both by the settled and the nomadic peoples, and constitute the principal sources of meat. Fish are a valuable food among the peoples living in the river valleys and along the coast. Fowl are kept in the rural villages. Milk is a standard article of diet wherever it is obtainable. The milk of sheep or goats is most widely used, but that of cows, water buffaloes and camels is utilized in many areas. Milk is normally consumed in the form of buttermilk or a soured milk product, known as *leban*. Cheese is also made, but it is rarely as popular as in other Arab countries. Clarified butter and the fats derived from the tail tissues of the local breeds of sheep are important sources of fat among all population groups.

The least diversified diets are probably found among the nomadic tribes, who subsist on the products of their herds, supplemented by dates and wheat or barley breads. Camel's milk is employed by the nomadic Bedouin. The tribal Arabs of the southern marshes depend largely upon the milk of the water buffalo, fish and wild waterfowl, rice and occasional edible rushes. Measures to raise the standards of nutrition among the various urban and rural groups are being studied by educational and health authorities. Improper feeding in infancy, particularly in the course of weaning, which is often deferred until the second year of life, is a factor contributing to the high mortality among young children. The organization of a national nutrition committee, to function in an advisory capacity to the governmental agencies concerned, and

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Ait.; Post; Boiss. 1: 542; Ph. Ind. 1:155.

K.B. 319.

This is a shrubby plant of northern Iran, Afghanistan, the Caucasus, and Turkestan, 3 to 4 feet high, with numerous stems springing from the perennial rootstock. The underground rootstocks are collected and used as soap for washing the hair and clothes. The Irani drug is no doubt a substitute for the older Roman and Egyptian Struthium, the root of *G. Struthium* L. of southern Europe. The roots contain from 6 to 16 per cent saponin.

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Halimodendron argenteum Fisch. (Leguminosae)

Field 14, 31 (Iraq).

Halimodendron is a thorny shrub found in Iran, the Caucasus, and Central Asia. Fruits of this plant were collected without a local name, from Yezd-i-Khast between Isfahan and Shiraz. The thorns are used in native surgical operations. Inflated pods, 2 cm. long and oblique, are brown, and contain two or three seeds like chick peas.

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Helianthus annuus L. (Compositae)

افتاب کردن

Aftāb gardan (Teh.); Ward-ash-shams, Shams-wa-qamar (Iraq); Qunah baqan (Turk.); sunflower seeds.

Field 122 (Teh.), 72, 73 (Iraq).

Two kinds of sunflower seeds are represented in these collections: black, ovate-elongate, 12 by 6 mm.; and white, smooth, broader achenes, 12 by 7 mm. There is a good market for these seeds, which are used for human consumption and for bird food, and yield by expression an oil for cooking purposes. Many tons of the seeds are produced annually in the U.S.S.R.

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Helicteres Isora L. (Sterculiaceae)

بهمن پیچ

Bahman-i-pīch, Pachman-i-puh (Teh.); Kisht bar Kisht (Pers.); Pechak, Marorphali (Hind.); Avartin (Sans.); the Persian and Sanskrit names signify the furrows on a ploughed field; the spiral fruits.

Ibn Baitar; Achundow; Fl. Br. Ind. 1: 365; Ph. Ind. 1: 231.

Field 137; K.B. 320.

The East Indian screw tree occurs in dry forests throughout central and western India and in Ceylon, Java, and northern Australia. The spirally curved fruits are sold in all Indian bazaars and

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in more northern countries. The fruit is composed of fine, slender, angular carpels twisted like corkscrews, which together form a cone 3.5 to 5 cm. long. The carpels are pubescent and greenish brown, and each one contains a single row of dark brown, angular seeds.

The drug has demulcent and slightly astringent properties, and is employed as a medicine for dysentery and for griping of bowels and flatulence in children.

Heracleum persicum Desf. (Umbelliferae)

گل سپر

Gul-i-sipar (Teh.); Gul-i-parr (Isf.); Goleper (Kerm.); Giafari (Schl.); the fruits.

Schl.; Post; Boiss. 2: 1044.

Field 434; W.H.M.M. 150779; K.B. 320.

This species of cow parsnip is indigenous to the moist valleys of the Elburz Mountains, and is related to *H. pubescens* M.B., of a wider range. Boissier refers the plant Goulpere to *H. lasiopetalum*. The fruits, which are sold as a spice and used in pickles, are ovate-oblong, villous on the back, the margin aculeate, the dorsal vittae thick and clavate, reaching to two-thirds the length of the mericarp. While some of these plants are used medicinally and for food, other species in America and Europe are poisonous and produce erysipelatous inflammation (Cormerin, "Des Plantes Vénéneuses," 1887). [263]

Hibiscus cannabinus L. (Malvaceae)

حل جل

Jiljil (Iraq); Hab-el-zalim (Ar.); Palsan (Hind.); Ambari (Duk.); the seeds.

Field 61 (Iraq).

The Deccan hemp plant is grown in western India and the tropics. The seeds are dull grayish brown, triangular or kidney-shaped, 5 by 3 mm. They contain an oil useful for culinary and lubricating purposes. The seeds are used in medicine and as cattle food. [252] [231]

—*H. Trionum* L., Qunnab, called Jiljil near Basra, yields a bast fiber resembling that of the Deccan (H.F.).

Holarrhena antidysenterica Wall. (Apocynaceae)

میوهٔ زبان کنجشک

Mīvah-i-zabān-i-gunjishk, Tukhm-zabān-i-gunjishk-i-talkh, "the seeds of the bitter sparrow's tongue" (Pers.); Lizan ul asafir (Achundow); Indrajaou (Hind.); Estrefanthus; the seeds.

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Bizre Kattane (Schl.); the names for linseed in India are Alsi, Atasi, and Alashi; linseed.

Ph. Ind. 1: 239.

Field 21; 63, 67 (Moroccan and River Plate seeds from Iraq); W.H.M.M. 150809, 150920; K.B. 326.

Aitchison informs us that in Afghanistan the flax plant and seed are known as Zagher; the oil of the seed as Roghan-i-zagher; the fiber and linen cloth as Katan or Katun. The plant is cultivated in Turkestan for the oil of its seeds, but, as in India, the fiber is not collected. In Iraq Moroccan linseed has been distributed in considerable quantities as Indian varieties have been severely attacked by rust disease (G.). The oil is valued for various industrial purposes and the seeds are eaten as sweetmeats.—Boiled with *Althaea* sp., the seeds are used as a poultice for boils (H.F.).

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Lolium rigidum Gaud. (Gramineae)

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گل چمن

Gul-i-chaman (Teh.); Ziwan (Iraq); rigid rye grass; seeds.

W.H.M.M. 150705.

This is a tufted annual grass grazed by sheep and other animals. It is related to the darnel grass (*L. temutenlum*), "Jamdar," which is regarded as an obnoxious weed, since its seeds are sometimes infected by an ergot fungus generating a narcotic poison. The use of the seeds sold in Tehran is not known.

Loranthus Grewinkii Boiss. and Bunge (Loranthaceae)

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کشمش کولی

Kishmish-i-kūlī (Teh.); Kishmish-kawali (Ind. bazaars); Dibk (Ar.); mistletoe berries.

Field 139; W.H.M.M. 150756.

These fruits are called raisins of Kawali, Kawali being the name for gypsies in Iraq and Iran. Le Bode in his "Travels in Lauristan and Arabistan" mentions his being shown in the forests of the Zagros Mountains, on the road from Kermanshah to Baghdad, a fruit called by the natives Angur-i-kauli (Kawali) or grapes of Kauli, a parasite on the oak. The dried berries are rounded, 8 mm. in diameter, soft, dark brown, and shriveled, and have one seed. They are mawkish in taste, containing a form of caoutchouc which can be drawn out in threads. The author of the "Makhzan-el-Adwiya"

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This plant, allied to *Colchicum*, occurs in North Iran, Afghanistan, the juniper tracts of Baluchistan, and in the Punjab. Aitchison found this plant common all over the Badghis and Khorasan. The corms are collected as a medicine and exported from Meshed through Iran via the Persian Gulf to India. The drug is one of the forms of the ancient Hermodactyl. It is probably the Surinjan-i-shirin or sweet Surinjan, a medicine used by Mohammedans in India. The root from Hamadan is broken into pieces showing a white, starchy fracture with no perceptible taste or smell. The drug is said to have the same action as the bitter Surinjan (*Colchicum* spp.) as a remedy for rheumatism.

Mirabilis Jalapa L. (Nyctaginaceae)

تخم لال عباس

Tukhm-i-lāl'abbās (Teh.); Gul-i-abbasa (Pers.); fruits of the marvel of Peru.

W.H.M.M. 150895.

The marvel of Peru or four-o'clock is a plant of tropical America. It is named *Mirabilis*, or wonderful, on account of the variegated colors of the flowers, and *Jalapa*, as it was formerly supposed to be the true jalap plant. The fruits are oval or vase-shaped, 8 by 5 mm., dark reddish brown, five-ribbed, and papillate, containing a white, starchy seed. Little is known about its medicinal action, but the fruits have been said to be used in adulterating black pepper. [263]

Morus nigra L. (Moraceae)

شاه توت

The fruits: Tūt-i-kushk (Teh.).

The root: Rishah-shāh-tūt (Teh.).

The tree: Shāh-tūt, "royal mulberry" (Pers.).

Field 46A, 269, 402; K.B. 327.

The black or grafted mulberry is cultivated in Iran and Baluchistan, principally for its fruit; the white mulberry (*M. alba*), for sericulture. They both yield fruit which in season is sold in the bazaars and met with in nearly every household (Ait.). When carefully dried, the fruits are called Tut-i-dham, and supply a wholesome and nutritious article of diet during winter. [262] [231] [215]

The other drug of the mulberry tree from Tehran consists of the bark of the root, reddish colored externally, with strong, silky white liber cells. It is used for dysmenorrhea.

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Field 194; W.H.M.M. 150774; K.B. 328.

Schlimmer remarks that Shiraz supplies Iran with these seeds and adds that they are an indispensable ingredient in iced sherbet (sorbets à la glace). The seeds, or nutlets, are black, punctulate, oblong or ellipsoid, 2 by 1 mm., arched on one side, with a bifurcate line on the other. They are smaller than those of the sweet basil, with a less prominent, white umbilicus, but, like them, they become coated with opalescent mucilage when placed in water. The seeds are given locally for lung and chest complaints and as a heart tonic.

Olea europea L. (Oleaceae)

زیتون

Zaitūn; olive.

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Cultivated for its fruits and for the extraction of oil, the olive tree provides an important article of diet and medicinal remedy.—Leaves are sometimes prepared as a decoction for coughs (H.F.).

Onosma echioides L. (Boraginaceae)

ریشه هوه چوبه

Rishah havah-i-chūbah (Ham.); Havah-i-chūbah (Teh.); Ratan-jot (Hind.); Indian alkanet root.

Achundow; Schl.; Boiss. 4: 181; Fl. Br. Ind. 4: 178; I.H.B.; Ph. Ind. 2: 54.

Field 165; W.H.M.M. 150718; K.B. 329.

This plant, growing in Afghanistan and Siberia, affords a root which is substituted for European alkanet (*Anchusa tinctoria*), from Al-kanna of the Arabs, employed as a dye and medicine in early times. The root of the allied species, *O. Hookeri* Clarke, is called Ranj-i-badshah, "King's dye." The tapering root has a purplish red color, and the cortical portion easily separates in flakes. It imparts its color to oils and spirits, and is used in coloring medicinal preparations. In Iran the root is powdered and given to horses for coughs and as a condition powder.

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Orchis latifolia L. (Orchidaceae)

سعلب

Sa'lab (Teh.); Salab-misri (Ar.); Punjah-i-salaba; Oriental salep.

Field 229; W.H.M.M. 150908.

Palmate or hand-shaped tubers of orchids are considered the best for medicinal purposes. They are deprived of their epidermis by

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This agaric occurs on the oak and larch, and in sizes as large as a fist or a child's head; it is light, spongy, and friable, and is not easily powdered. The use of this fungus in medicine is of very ancient date. Avicenna insists upon the great efficacy of agaric as an alexipharmic. Mohammedan physicians closely follow the Greeks in considering that it removes all kinds of visceral obstructions and expels diseased humors. It is also a Chinese drug. The light, white, spongy interior is made into touchwood, spunk, or tinder, and was formerly used to absorb blood and secretions from wounds, etc.; hence the old name Fungus or Boletus Chirurgorum given to the plant. [372]

Prosopis Stephaniana Kunth (Leguminosae)

خرنوبان

Kharnūbān, Kornub (Isf.); Shok (Ar.); Kunbut (Syr.); Chughak: "humpbacked, bent," applied to the contorted pods, Tukhm-i-jinjak (Ait.); the pods.

Field 403.

This is a loose, straggling, thorny shrub of the Caucasus, Syria, Iran, and northern India. The pods are brown or copper-colored, 4 by 1.5 cm., galled, swollen, and contorted, containing several oval, brown seeds separated by soft, spongy dissepiments. The pods are eaten by sheep, but the seeds pass through undamaged and germinate readily at the coming of the winter rains (G.). The pods and roots of the plant are regarded as astringent and are given for dysentery. [231]

Prunus Amygdalus Stokes var. **amara** Baill. (Rosaceae) [245]

بادام تلخ

Bādām-i-talkh (Teh.); bitter almonds.

Field 52A, 171.

The bitter almond tree, like the sweet, is a native probably of Iran and Asia Minor, and is indistinguishable in botanical characters. In form and appearance bitter almonds closely resemble Valencia almonds, but are usually smaller. They are employed in confectionery and for flavoring, but as the hydrocyanic acid yielded by them varies in quantity, they should be used with caution.—An ointment made of bitter almonds is applied to furuncles (H.F.). [263]

Prunus Armeniaca L. (Rosaceae)

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زرد آلو

The fruit: Zard ālū (Pers.); Mishmish (Iraq); Khūbani, with stones removed (Hind.); dried apricot.